

Global Warming

ESS Analysis – Team LUCA 2

Assignment #3

From our research on global warming, here are several contributing factors:

1. Carbon Cycle (Greenhouse gases)
2. Rock Cycle
3. Sedimentation/Erosion
4. Deforestation
5. Desertification (increase of dust/aerosols trapped in the atmosphere)
6. Increase in global temperature
7. Increase in sea surface temperature
8. Changes in the water cycle
9. Changing climatic patterns

Event to Sphere Interactions

E>B: Global warming is causing a shift in species' ranges (location in which they can survive and reproduce). Forty percent of wild plants and animals that have been studied over the past 40 years are relocating.

E>B: Global warming is also causing a shift in phenology (the timing of biological activities that take place seasonally). Seasonal behaviors of many species now happen 15-20 days earlier. Migrant birds are arriving earlier, butterflies are emerging sooner, and plants are budding and blooming earlier.

E>B: Global warming is causing a loss of habitat

E>B: Global warming is impacting migratory patterns of many types of wildlife

E>B: Other consequences of global warming to the biosphere include adverse affects to human health by introduction of disease, loss of agricultural crops, declining air quality, and more intense weather phenomenon.

E>B: Acidification of the ocean from both rising sea level temperatures and increase amount of carbon dioxide in the atmosphere, is affecting marine life such as corals, lobsters, and sea urchins.

E > L: (Global Warming heats the Lithosphere land masses resulting in more Deforestation and Desertification, and affects the overall Carbon Cycle)

E>L: Rising temperature is thawing permafrost tundra

E>A: Increase in air temperature and sea surface temperature

E>A: Increase in the amount of moisture in the atmosphere due to the increase in the amount of evaporation.

E>A: Changes global climate patterns and local weather

E>H: Melting of glaciers, sea ice, and ice sheets

E>H: Disruption of water cycle

E>H: Rise temperatures, is leading to expansion of the ocean. As water warms, its density increases and it expands. This coupled with cryosphere melting will lead to rising sea levels.

Sphere to Event Interactions

B>E: As permafrost thaws, the microbes that decompose this material become more active, releasing carbon dioxide and methane to the atmosphere. Methane is 25 times more effective per molecule at trapping heat than carbon dioxide.

B>E: Loss of forests and other vegetation, leads to increased amount of carbon dioxide staying in the atmosphere.

L > E: (Carbon Cycle components in the **Lithosphere** (greenhouse gases) promote **Global Warming**)

L > E: (Deforestation of **Lithosphere** promotes **Global Warming**)

L > E: (Desertification of the **Lithosphere** promotes **Global Warming**)

L > E: (Rock Cycle components (sedimentation, erosion) in the **Lithosphere** influence **Global Warming**)

L > E: (Tectonics with its affect on the Rock Cycle/volcanism/etc in the **Lithosphere** influences **Global Warming**)

A>E: Traps greenhouse gases will causes an increase in the rate of warming

H>E: Melting of the cryosphere reduces the albedo effect causing sea surface and surface temperatures to increase.

Sphere to Sphere Interactions

H>B: Wintertime precipitation falling as rain instead of snow and snow melting occurring earlier in spring decreases the amount of water available in late summer months. This can lead to an increased rate of wildfires and a slow recovery for the forest as well as drought-stressed trees and plants becoming more susceptible to attacks from insects.

B>B: As range and distribution changes, migratory patterns as well as the change observed in pheology, leads to a domino effect in the food chain.

A>H>B: Changes in the water cycle and evaporation/precipitation patterns will lead to thirstier people and plants.

B>B: The changes in migration routes and species ranges will lead to insect and disease outbreak, invasion of invasive species, and loss of habitat for many species.

B > L: (Humans burn trees leads to **Deforestation** of the **Lithosphere**)

A > L: (**Atmosphere** winds weather/erode **Lithosphere** rocks creating dust)

H > L: (**Hydrosphere** water/precipitation weather/erode **Lithosphere** rocks creating **sedimentation**)

L > L: (**Lithosphere** (soils, sedimentary rocks – limestone/dolomite) stores carbon deposits – coal, gas, oil)

L > L: (**Lithosphere** stores carbon deposits – coal, gas, oil – and methane, nitrous oxide)

L > L: (**Lithosphere Tectonics** affect **Carbon Cycle** via **Lithosphere** earthquakes, volcanoes, mountain folding)

L > L: (**Lithosphere Tectonics** affect **Deforestation** via **Lithosphere** earthquakes, volcanoes, mountain folding)

L > L: (**Lithosphere Tectonics** affect **Sedimentation** via **Lithosphere** earthquakes, volcanoes, mountain folding)

L > L: (Lithosphere deforestation exposes soil to **Lithosphere erosion**) deposits – coal, gas, oil – and methane, nitrous oxide)
L > L: (Lithosphere desertification decreases useful **Lithosphere** soil)
L > A: (Carbon Cycle deposits – coal, gas, oil – are burned and greenhouse gases are released into the **Atmosphere**)
L > A: (Lithosphere volcanoes release greenhouse gases into the **Atmosphere**)
L > A: (Lithosphere desertification exposes more land/soil that releases more carbon into the **Atmosphere**)
L > A: (Lithosphere fertilizers release nitrous oxide into the **Atmosphere**)
L > A: (Lithosphere Landfills release methane into the **Atmosphere**)
L > L > A: (Lithosphere Tectonics cause **Lithosphere** earthquakes, volcanoes, mountain folding releasing dust/aerosols into the **Atmosphere**)
L > B: (Lithosphere desertification decreases **Biosphere** biodiversity)
L > B: (Lithosphere desertification increases **Biosphere** migrations)
B > L: (Biosphere Humans cultivate rice and it puts methane into the **Lithosphere** (soil))
B > L: (Humans burn trees leads to **Deforestation** of the **Lithosphere**)
A > L: (Atmosphere winds weather/erode **Lithosphere** rocks creating dust)
H > L: (Hydrosphere water/precipitation weather/erode **Lithosphere** rocks creating sedimentation)

References

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